National Qualifications 2018
Qualification Verification Summary Report

Skills for Work: Laboratory Science

The purpose of this report is to provide feedback to centres on verification in National Qualifications in this subject.

National Courses

Titles/levels of National Courses verified:

Skills for Work: Laboratory Science National 5 (C781 75)

- Careers Using Laboratory Science (HN9X 75)
- Working in a Laboratory (HN9W 75)
- Practical Skills (HN9Y 75)
- Practical Investigation (HP00 75)

General comments

The course has been delivered by centres since session 2010–11.

All centres visited in session 2017–18 had a very good understanding of the requirements of the course/units and had contacted other centres prior to undertaking the course for the purposes of sharing resources and good practice.

For this course, all centres are required to apply for approval. The approval visits prior to the delivery of the course have been particularly useful for both centres and verifiers to discuss any issues related to the course that required clarification, including appropriate internal verification procedures, appropriate course assessment procedures, as well as the expectations of an external verification visit towards the completion of the course.

This is an SCQF level 5 course and candidates should have attained or be studying a science subject and Mathematics at National 4 or 5 to be considered for entry.

Course arrangements, unit specifications, instruments of assessment and exemplification materials

Assessors and internal verifiers in all centres were very familiar with the course as a whole, as well as the individual unit specifications.

The SQA assessment materials were used by all centres with appropriate changes to enhance the candidate experience. SQA support materials for the units were used, again with appropriate changes and additions to support learning and individual centre assessment strategies.

Any materials organised by centres did not deviate from the required assessment of learning outcomes for all units. Where centres could justify omissions from the assessments that avoided repetition for candidates, this was deemed appropriate by external verifiers when the changes were documented and agreed internally by centres.

Evidence requirements

The evidence submitted by centres during external verification showed a clear understanding of the requirements by all centres. There were no omissions for any outcomes in all units.

The course is a Skills for Work course and, as such, centres should ensure that employability skills and self-analysis are a focus at appropriate points in the course.

The SQA materials give examples of candidate responses in the candidate reviews of these skills. Progression in these skills should be evident for each candidate in their folio.

Administration of assessments

All centres assessed the units of the course to an appropriate standard and were able to justify both positive and negative candidate assessment for each outcome or unit as appropriate.

Assessment evidence was well presented and easily accessible for external verification of each candidate.

Appropriate internal verification was evident in all centres. All centres had internal verification plans and documented evidence to show discussion of internal verification issues arising during the course and documented decisions regarding these issues. Internal verification had taken place in a formal, documented manner in all centres.

Most centres were in the process of completing the Practical Investigation unit at the point of external verification but could show that good plans were in place to complete the teaching and assessment of the unit. This unit should be the final unit undertaken by candidates as it allows the scientific and employability skills gained in the other units to be used in a practical scientific situation.

Areas of good practice

Centre judgements have been found to be reliable in terms of individual outcomes for each candidate, whether the outcomes have been achieved or not achieved. When any outcome has required a re-sit, centres have made it clear for external verification which assessment showed achievement of the outcome, and presented both unachieved and achieved assessments as evidence.

Some centres had candidates from a variety of backgrounds on the course, from National 4 to Advanced Higher. In such cases, centres ensured that all candidates met the minimum requirements for the course outcomes.

Centres have opted to run the Careers unit throughout the course, allocating one or two periods per week. This is good practice, as it allows candidates time to reflect on their self-evaluations, which need to be spread throughout the course

to be meaningful to candidates and allow them to access scientific and work-related skills as they progress. Many centres also managed this time in order to have individual discussions with candidates about their progress and to offer suggestions to ensure achievement in any areas of difficulty.

Many centres combined outcomes 1 and 2 in the Careers unit to avoid duplication for candidates. Where outcomes in the Careers unit had been overtaken by candidates during the completion of their presentation, centres clearly indicated where this had occurred.

All centres showed awareness of the changes in the course in 2017–18. Namely, the introduction of a completed CV for each candidate, which illustrates the skills undertaken in the course, as well as an awareness of CHIP and CLP hazard symbols.

A visit to an industrial site is not mandatory for the course, however many centres are using this activity to enhance the candidate experience, allowing them to see science skills in action in the work place and to talk to working scientists about their career trajectories. Other centres had organised visits from STEM ambassadors to the centre for the same purpose. Some centres had extensive links with local FE colleges/universities and many of the practicals/assessments in the course were conducted at the FE colleges/universities.

Centres ensured that the three self-evaluations required in this unit were suitably spread out through the course with the first at the beginning and the last towards the end. The self-evaluations were discussed with candidates and progress in each skill area was evident.

Many centres liaised with their employability principal teachers and careers officers to enhance the overall course, setting up mock interviews and application forms for employment, as well as the previously mentioned STEM ambassador visits.

As the course covers work from all areas of science it is deemed good practice to involve specific members of staff for advice and even to assess/teach areas that the timetabled staff may find difficult. An example of this is centres in which radioactive sources are available for experimental use and the timetabled staff have limited physics experience in the safety measures required when handling the sources. In some centres, the physics staff or technicians have offered sound advice or even taken the class for this section. The same arrangements have been used for chemistry and biology aspects of the course. In some centres, the internal verification of particular outcomes was carried out by a verifier who specialised in that area.

The course is not externally assessed through examination and there is no requirement for centres to assess the course through unit tests or examination. Many centres added rigour to the course by making their own short unit assessments. Other centres used their prelim time to timetable practical assessments for candidates. Some centres made use of Outcome 1 and

assignment assessment standards used in the discrete sciences at National 5 to set a standard for the Practical Investigation unit undertaken by candidates.

Where candidates did not meet the standard required for an outcome within a unit, centres made it clear to both candidates and external verifiers why the standard had not been met and appropriate remediation was offered before candidates were allowed to attempt the outcome again.

Many centres used staff trained to level 3 in microbiology to verify Unit 3 Outcome 1, for which various subcultures need to be grown by candidates.

Calculations evidence was seen throughout the course, rather than just in Unit 2 Working in a Laboratory and especially in processing results from practical investigation. The calculations were of a standard required for examination in National 5 discrete sciences.

In Unit 4 Practical Investigation, the plan was well laid out and candidates were evaluating their hypothesis and method. Candidates had carried out a practise investigation together to ensure understanding of how to plan, carry out and write-up their own investigation independently.

In some centres a further unit to develop the numeracy skills required for the course had been introduced and taught.

Specific areas for improvement

Centres should ensure that internal verification is taking place within a suitable time after assessment. This ensures that candidates are given feedback as quickly as possible and are given the best opportunity to pass an outcome on the next attempt after appropriate remediation. The timing of internal verification for individual outcomes is a centre decision, but should not take place more than approximately two weeks after assessment for this course, as the course is fully internally assessed.

Internal verification must include the verifier's signature and date of verification. The sample size for internal verification is dependent on the cohort. For a full practical class of 20 candidates, approximately 12 candidates should be internally verified. For any cohort of fewer than 10 candidates, all candidates should be internally verified. The number to be verified should be agreed and documented.

Where visual verification of candidate practical work has taken place then centres should make this clear for external verifiers. This can be best established by including in the centre's verification policy for this course. The verification policy should be short and concise but agreed by assessors and internal verifiers.

When centres produce their own class records for external verification, they should ensure that these records match closely with the exemplar records produced in the SQA materials.

Unit 1 Careers

The Careers unit should be assessed throughout the course to ensure that the first self-evaluation is covered by candidates close to the start of the course, with the second around the middle of the course and the last evaluation towards the end. This will ensure that progress is made by candidates on the skills involved in this course including practical skills that are developed in other units.

In the Careers unit, candidates should be encouraged to research their own choice of industries. In some centres, candidates had obviously collaborated too much and repetition was clearly evident.

Candidates should provide more detail in their candidate reviews, eg how they will work on their goal, and these goals should be reviewed in candidate reviews 2 and 3 instead of setting new goals each time.

Unit 2 Working in a Laboratory

Centres should ensure that candidates present at least one piece of evidence for the completion of each calculation type in the Working in a Laboratory unit. Where this evidence is contained in another unit, this should be made clear for external verification. Centres should encourage candidates to use *an appropriate number of significant figures* for the final answers to calculations and ensure the use of units in final answers where appropriate. *'An appropriate number of significant figures'* for final answers is the guidance associated with external examination in that particular science subject at National 5 level. If significant figures and units are not considered by candidates in calculations, then the evidence presented will be deemed inappropriate. When carrying out the calculations for the Working in a Laboratory unit, the candidates must show the recorded measurements as well as the working for the calculations.

Unit 3 Practical Skills

The evidence for the titration practical in the Practical Skills unit requires candidates to show initial and final volumes with appropriate units. Centres should ensure that candidates are made aware of this.

Unit 4 Practical Investigation

In the Practical Investigation, the candidates need to provide reasons for the variables that they are keeping constant and the resources being used.

In all areas of the course where candidates are required to record experimental data then this should be presented in an appropriate manner, eg table with correct headings and units. where appropriate, to the standard expected in discrete science assessments.